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TROUBLES WITH TRANSPORT IN PERU

(See Bulletin No. 1)

HOW TEACHERS MAY OBTAIN THE BULLETINS

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Peru, Which Is on President-Elect Hoover's Itinerary

PERU has extended a cordial invitation to Herbert Hoover to visit its shores in the course of his trip to South America.

The President-elect of the United States will find, in the land of the Incas, samples of nearly all the climates and most of the geographical conditions he has met in his travels to other continents.

Peru has the sand dunes of the Sahara; the fertile, sun-bathed, irrigated valleys of California; the dry grazing lands of Australia; the productive mountain valleys and uplands of Kashmir; the bleak plateaus of Tibet; the snowy peaks of Switzerland; and the tropical jungles of Central Africa and Brazil.

Much of Peru is occupied by the towering Andes, with few passes less than 15,000 feet high, and with numerous peaks exceeding 21,000 feet. These great ramparts are chiefly responsible for the diversity of Peru's climatic conditions. They precipitate the moisture of the Atlantic winds and so create the tropical jungles that stretch from their eastern flanks toward the interior of the continent; they thrust foothills up into the cool regions of the upper air; and they cut off the Pacific coast section from the moisture-laden easterly winds, making much of it a desert.

The Three Geographic Regions of Peru

Although the strip of Peru between the Pacific and the western foothills of the Andes is devoid of rain and largely desert, many streams from the mountains break across this region to the sea, and the relatively narrow valleys, irrigated with their waters, constitute the most productive land of the country.

Peru has an area of about 700,000 square miles and is therefore only slightly smaller than Mexico and well over a quarter the size of the United States. If Peru could be laid down on the surface of the United States so that its southernmost point coincided with the southernmost projection of Texas, its northeastern corner would lie near Peoria, Ill., and its northwestern extremity near Cheyenne, Wyoming. The rough triangle would cover practically all of Texas, Oklahoma, and Kansas, half of Nebraska, parts of Illinois, Missouri, Colorado, Iowa and South Dakota, and fragments of New Mexico and Wyoming.

Just as the United States was settled from the Atlantic coast and developed first its coastal strip, leaving as an unknown region for generations the country to the west beyond its mountains and deserts, so Peru has developed. The European conquerors of its Inca empire entered the country from the Pacific coast, and it is along this strip of coast land that European blood and culture have made themselves most strongly felt.

The Heirs of the Incas Populate the Sierra

East of the coastal region rise the three towering ranges of the Andes, their slopes, peaks and intervening valleys and plateaus constituting the "Sierra," the second of the three geographic divisions of Peru. In this lofty region the Inca civilization held sway with a marvelously intricate but efficient government before the Spanish came. Cuzco, the capital of the Inca empire, was situated in a fertile, protected valley of the Sierra region, and remains today one of the important Peruvian towns. Its population now, however, is only 35,000, about one-fifth that of the city when it was the Babylon of the Western Hemisphere.

In the almost inaccessible country to the northwest of Cuzco, and less than 50

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THE CATHEDRAL DOMINATES THE CHIEF PLAZA OF LIMA, PERU

The reputed mummified body of Pizarro, the Spanish conqueror of Peru, is contained in a glass casket in this handsome building of semi-Moorish architecture. It was Pizarro who founded the cathedral in 1535. Little remains of the original building (See Bulletin No. 1).

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Why Our Mexican Ambassador Entertains at Cuernavaca

AMBASSADOR MORROW entertained Col. Charles A. Lindbergh recently at his summer home in Cuernavaca, 75 miles south of Mexico City

What manner of place is Cuernavaca that the American Ambassador should be attracted to it?

The question can be answered with another question: Why did the Aztec Montezumas, Cortez the Conqueror, ill-fated Maximilian and the beautiful Carlotta go to Cuernavaca?

Because Cuernavaca, "The Sun Child of the Sierras," lacks only an apple tree, so it is said, to be Eden.

The American Ambassador motors out of the capital past Chapultepec Heights over a mountain pass 10,000 feet high, and down into the picture orchards of exquisite Cuernavaca Valley.

Snow-Capped Volcanoes Loom on Skyline

The town itself is on a hill overlooking the valley. Gorges or declivities form deep moats on every side. Once a visitor enters the city, he finds himself apart from the world but with splendid view of it. Behind Cuernavaca and against an azure blue sky stand snow-capped Popocatepetl and Ixtaccihuatl. At the city's feet spreads the tropic valley with sugar and coffee plantations, fields of rice and bananas, and orchards of lemon, orange and mango trees.

Naturally a town of such position and associations has many treasures; the Cortez Palace which now serves as capital of the state of Morelos, the Cathedral built in 1535, Olindo, the villa of Maximilian and Carlotta, but the prize of prizes is the Borda Gardens.

Don Jose de la Borda made a fabulous fortune out of his rich mines and, like so many others, made his home in Cuernavaca, renowned for its perfect climate and eagle view. De la Borda brought gardeners from Europe and spent more than a million dollars to reproduce on a grander scale the gardens of Versailles. This was in 1762. Cuernavaca still enjoys his extravagant creations. Within the gardens are lakelets, cascades and luxurious baths. Even to-day the grounds are adorned with roses growing on networks of trellises, groves of laurel and mango, fountains and great vases, casinos and pavilions. Perhaps the rich de la Borda set out to copy Versailles, but he achieved the tropical lushness of a Moorish retreat.

What a contrast between the rich de la Borda and poor Isabel Belaunsaren! Yet Cuernavaca is proud of this Indian girl, too. If she still lives she may be blind by now, because Isabel achieved fame by making miniature dolls. The toreadors, the dancers, the vaqueros, the flower sellers contrived by the "Queen of the Needle" are but half an inch high, and yet the details of costume stand inspection by a magnifying glass. Their making required the finest silk caught with the finest needles and required more of her eyes than her eyes found they could give.

Bulletin No. 2, December 10, 1928.

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miles distant, hidden away among the mountains, was Machu Picchu, the secret city, where the forerunners of the Incas, almost destroyed by barbarians, nursed their civilization and culture for centuries before going out into the valleys to found an empire. This old city, whose existence had been only a tradition for hundreds of years, was discovered in 1911 and uncovered in 1912 by an expedition of the National Geographic Society and Yale University.

The Sierra, or region of mountains, valleys and plateaus, is still the land of the heirs of the Incas. In this portion of Peru lives the largest single element in the population, the civilized Indians, descendants of the Incas. Though the population of Peru is not known accurately, it is estimated to be about 5,000,000. The Indians of the Sierra number close to 2,000,000.

In the Peruvian Sierra, too, are the great mining developments. Peru's mineral resources are almost inexhaustible. Gold and silver are the minerals on which most emphasis was placed by the Spaniards. Fortunes in both were removed from the country, but rich deposits remain. In recent years copper has led other minerals in the value of production. The copper mines at Cerro de Pasco are among the richest in the world. Almost every mineral substance known is believed to have been compounded in Nature's great Andean laboratory. The list of products from Peruvian mines covers much of the alphabet of ores from antimony to vanadium.

Building Railroads to Foothills an Engineering Feat

To the east of the Andes, cut off from the more developed portion of the country, lies the third geographical division, the region known as the Montana, Peru's land of the future. This part of the republic is made up of the wooded landward slopes of the Andes, grassy foothills, and the heavy, little-known jungles and forests that spread out to the east for a thousand miles or more along the broad valley of the Amazon and its tributaries. Because of the heavy rainfall, the growth of vegetation in this part of Peru is believed to be as heavy as anywhere else in the world.

Peru's problem in consolidating her Montana and developing it from a potential resource into an asset of tremendous value is, like the problem the United States had in winning its West, one of communications. And because of the precipitous Andes—with few of their passes lower than the crest of Mt. Whitney, the highest point in the United States—the matter of building railroads from the Pacific to the eastern forests is an herculean labor, requiring exceptional engineering skill and great capital. Even the building of railroads from the Pacific into the western uplands was a tremendous task.

There is yet no rail system in Peru—merely isolated sections of railway most of which are short lines extending from some seaport up a river course into the Sierra. The closest approach to rail systems is the group of lines from Callao and Lima into the mountains. After this road reaches the Sierra it has extensions for a hundred miles south along mountain valleys, and for a greater distance north to the famous copper region of Cerro de Pasco. This north-and-south railroad is looked upon as the nucleus for Peru's contribution to the proposed Pan-American railroad which all South Americans hope will one day connect Hudson Bay and Alaska with Patagonia.

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The Rise of Copper

WHEN a railroad system recently announced a plan to electrify its line between New York and Wilmington, copper producers rejoiced. Large supplies of copper will be required for this extension of the use of electricity. Copper has gone hand in hand with electricity into every new field it has conquered.

In colonial days copper was taken in small quantities from deposits along the Atlantic seaboard, but it was a shipment of copper ore from the Michigan deposits to the East in 1845 that marked the real beginning of our copper mining industry. Now the United States produces more copper than the rest of the world combined.

We Live in Invisible Cages of Copper Wire

Because copper is so widely used in the electrical field, it is called the electrician's metal. Wherever one sees electric lights and the use of electric power, there is copper. Pure copper drawn into wire is hidden in the walls of modern homes, in electric irons and stoves, and in the motors of electric vacuum cleaners, dishwashers, and refrigerators. In some cities one is literally caged in copper wire. Millions of miles of underground cable and overhead wires carry the click of the telegraph key and the sound of the human voice.

The copper wires of one of our telephone systems would encircle the world at the Equator more than 2,000 times. One of our telegraph companies operates over more than a million miles of copper wire and owns eighteen copper cables that connect the United States with Europe.

Copper wire made possible the inauguration of the transatlantic telephone service. Radio instruments, with their copper wire connections and coils, are entertaining the world daily.

Pure copper is too soft for many purposes. Alloyed with other metals, it can be widely used. Bronze is copper and tin. Brass is copper and zinc. Gunmetal is copper, tin and zinc. Each of these alloys is more than half copper. Copper is also alloyed with many other metals, including gold and silver.

You Can't Get Away from Copper

Disregarding the use of copper for electrical purposes, under its real name and those of its alloys, copper is seldom out of sight or reach of the average man in this country. He may sleep under a copper roof in a brass bed and be awakened by an alarm clock with brass works. While dressing he may sit on a chair that is held together by brass screws and pull on his shoes that have brass eyelets and, perhaps, brass nails in the soles. He may turn a brass knob to open the doors in his home, draw water from a brass faucet leading from brass pipes, and dry his hands on a towel from a brass towel rack, while the curtains at the windows hang from brass curtain rods. His food may be grown with the help of farming implements containing copper and its alloys, and cooked in copper kitchen utensils.

If he uses his automobile or a street car to go to office, he rides in either of two vehicles that are important copper consumers. On his way to town perhaps he will pass a bronze statue or two and show-windows that are encased in copper. If he draws coins from his pocket to make a purchase, he handles copper even though he has no pennies, for all of our coins, including the gold pieces, contain copper. The money may finally find its way into some merchant's cash register

© Photograph by Sumner W. Matteson

MARKET DAY AT CUERNAVACA

The market square on the right overflows to the street on all sides. The Indians are offering for sale bananas, mangoes, guavas, and many kinds of vegetables, which they grow on their small patches of cultivated ground surrounding their huts (See Bulletin No. 2).

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The Turin of Turning Wheels

ROME, Venice, Florence—these Italian names loom large in the eyes of an American.

The names of Milan and Turin, the industrial centers of Italy, fall as frequently, or more often, upon the ears of Italians. Nearly everyone knows that Michelangelo's "David" stands in Florence and that pigeons clutter the Piazza of St. Mark.

How many know that Italy has become the largest European producer of rayon and that Turin contributed most of the 50,000,000 pounds of rayon Italy produced last year?

Americans who visit Turin, or Torino, as the city is known to the Italians, will marvel at the industrial activity of a city that lacks water transportation facilities. No industrial city of a half million population in the United States is without a navigable water course at its front or back door. Turin occupies a fertile plain at the foot of the Alps, 65 miles as the crow flies from Genoa, the nearest seaport, and the Po River bordering the city on the east, can accommodate only small row boats and gondola-like pleasure craft.

Turin Is the Detroit of Italy

Good railroads, that form a network about Turin as a center, keep commerce moving to and from the city. The location of the city near the Italian end of the Mont Cenis tunnel that pierces the Alps, between France and Italy, causes much commerce to flow through it. The tunnel, which is about 8 miles long, is on a direct route between northwestern Italy and Paris. The French capital is less than 500 miles from Turin. Before the St. Gothard tunnel was completed, Turin was Italy's chief railroad center, but now it bows to Milan.

Although an internationally known automobile has been manufactured at Turin for two decades, and machinery, leather-working and tanning factories, iron foundries, silk and cotton weaving mills and other industrial plants are turning out a large volume of products daily, Turin, unlike many so-called factory towns, is unusually clean. And unlike many cities of Italy, particularly in the south, it is unusually modern. Broad, straight streets intersect each other at right angles, frequently opening into piazzas or spacious squares that are surrounded by attractive, arcaded buildings, forming unbroken walls four to five stories in height. Some of the piazzas have beautiful gardens, while others are bare save for street car tracks and electric light poles.

The Piazza Castello, the hub of Turin, was once within the wall that surrounded ancient Augusta Taurinorum, on whose foundation the Turin of today is built. The walled city was less than ten city blocks square. Now it covers many square miles. Excavations show that the new streets parallel the old.

Throne Room Used when City Was Capital Is Show Place

The wall has been destroyed, but the North Gate, one of the four that pierced it, has been preserved. It is a massive brick-faced structure with two large vehicular and two smaller pedestrian arches. A huge sixteen-sided tower flanks each end.

The Royal Palace, overlooking the Royal Gardens, near Piazza Castello, is a mute reminder of the days when Turin was capital of the Kingdom of Sardinia,

containing copper and later pay water taxes according to the reading of a copper meter.

In his office he talks over a brass telephone instrument, uses brass pins and paper clips, and with brass pens, and a pencil with a brass band, may write on stationery that has been engraved from a copper plate. A brass-bladed fan keeps him cool in summer, and the brass fittings of the heating system help to keep him warm in the winter.

Copper is with him on his business trip whether he travels by boat, train or airplane. Copper alloy plates are used in ship hull construction and in the construction of railroad cars and engines—both electric and steam. Ammunition and fighting machinery of various kinds use an enormous amount of copper and copper alloys. During the World War more copper was produced than in any equal period before or since.

Sixteen states and Alaska each produce more than 100,000 pounds of copper annually. Arizona, our major copper-producing State, contributed nearly one-half of our output of more than 1,700,000,000 pounds in 1926. Utah, which supplied about 259,000,000 pounds, topped Montana by about 2,000,000 pounds, and Michigan, last of the "Big Four," produced about 174,000,000 pounds.

Bulletin No. 3, December 10, 1928.

© *Photograph by Captain A. W. Stevens*

COPPER MINES ABOVE BINGHAM, UTAH, "THE WORLD'S NARROWEST TOWN"

One winter recently an avalanche of snow slid off the side of this canyon and buried people in the copper mining camp below. The town is 2 miles long and one narrow street wide.

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Punjab's Mammoth Irrigation Project

PUNJAB Province in India is spending $90,000,000 to irrigate an area equal to Massachusetts, Connecticut and Rhode Island.

Four mammoth dams will feed waters from the Himalayas into 50,000 miles of canals. Farms with orchards of apple, pear, peach, apricot, plum and even fig trees will spread where the silver lanes of water run. Temperate and tropic crops of all kinds can be grown in Punjab, and the assurance of water there brings a guarantee against famine to all India.

Though one of the last districts to come under British control, the Punjab has long been noted for its progressive viewpoint and modern activities. It is a vast agricultural state built upon irrigation, the dry climate of its plains making farming possible only where canals lead Himalayan rivers into the fields.

Punjab Means Land of "Five Waters"

There are seven of these great streams which flow from mountain snow fields down over the hot, dry plains. Of these the Indus and Jumna, a branch of the Ganges, form the two outer limits of the Province. Between them are the five finger-like tributaries of the Panjnad, from which the district received its name in the days of ancient conquests. The word Punjab comes from an old Persian compound meaning "five waters."

Punjab Province is shaped like a letter "W." The top extends far into the hill country which forms the north of India; the left leg of the "W" drops into the great desert. Between these two extremes lie the plains for which the Province is famous. On their irrigated surface crowd twenty-five million people.

The Punjab is one of the few parts of India where Mohammedans greatly outnumber the Hindus. It is also the homeland of the Sikhs, that tall and swarthy race who police so much of the British Empire. The great variety of racial and religious types in the province, its nearness to the border, and the fact that Simla, India's official summer capital, lies in its hills, combine to give the district romantic interest.

The Scene of Many Kipling Stories

Historic Lahore, the provincial capital beside the river Ravi, is celebrated among the cities of India for its heat in summer and cold in winter. Early in May, government officials retreat to the hills for the duration of the hot season. Amritsar, the holy city of the Sikhs, is built around an artificial lake. Its bazaars are famed for Kashmir shawls and oriental rugs. Either of these two Punjab cities might have sprung full grown from some oriental fairy tale. Their sky lines give the impression of stage scenery, and their streets are perpetual pageants of movement and color.

Delhi, the capital of the Indian Empire, lies in a federal district cut out from Punjab territory. This old city on the River Jumna was capital of the ancient Mogul Empire of India and boasts some of the most beautiful mosques and palaces in the world. Like Lahore, however, it is famed for its summer heat, and the English early seek refuge from the sun in the Simla hills. The viceroy and his governmental family conduct their official duties at an elevation of 7,000 feet during the hot season.

It is to beautiful Simla, high amid the pines and cedars of the foothills, that

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and for five years, 1860-65, capital of Italy. The palace contains many statues, historical paintings, frescoes and tapestries. The throne room, with its elaborate chandeliers, candelabra and velvet hangings, is one of Turin's show places.

Works of art are also on display at the Gallery of Modern Art, the Museum of Ancient and Applied Arts, and the Picture Gallery. An interesting display of Egyptian antiquities is preserved in the Museum of Antiquities, including documents, vases, jewelry, food and musical instruments dating back to the 17th century, B. C. The Armory adjoining the Royal Palace contains more than fifty suits of armor and various historic implements of war.

The Loftiest Walled Building in Europe

In the Cathedral of Turin there is a piece of linen, which tradition holds is a part of the shroud in which the body of Jesus was wrapped. A copy of Leonardo da Vinci's "Last Supper" is displayed in the doorway of the edifice.

Valentino Park, along the Po River, is Turin's Riverside Drive. It has a public garden, a lake, two castles, and is beautifully laid out with winding roadways and promenades.

Count Cappuccini, across the river, offers a splendid bird's-eye view of Turin. The height of Turin buildings is unusually uniform as viewed from the mountain. Here and there a church dome rises above the house tops, but the dome and spire of the Mole Antonelliana, said to be the loftiest walled building in Europe, stands out boldly above all of them. It is but 8 feet shorter than the Washington monument.

Bulletin No. 4, December 10, 1928.

© *Photograph, U. S. Navy*

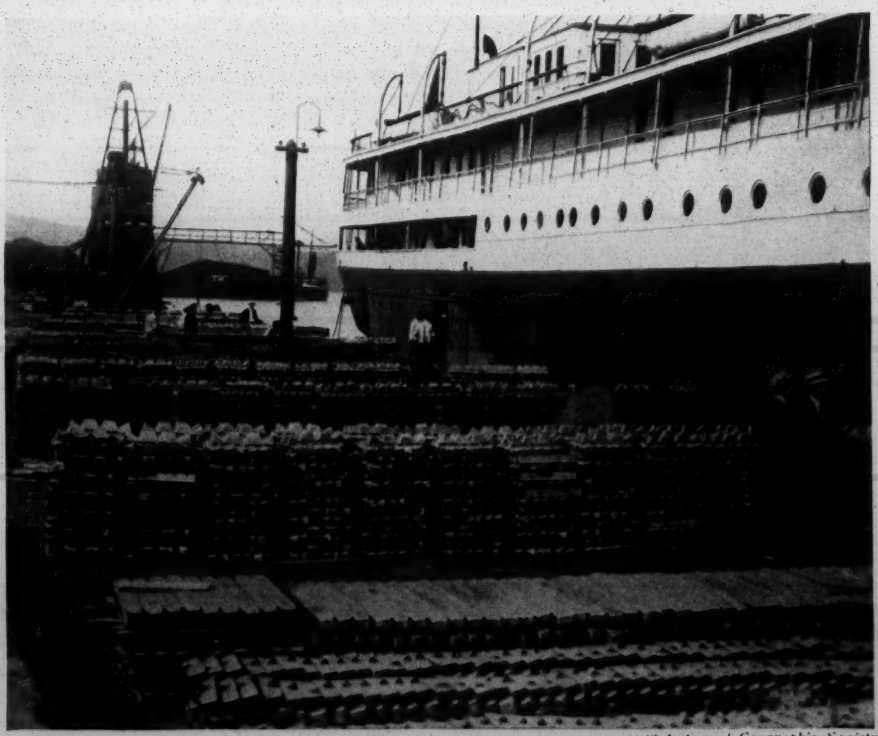
WHEN THE FLEET IS AT CALLAO

Peru is very friendly toward the United States. Notice the signs posted in front of a motion picture theater for the information of American sailors (See Bulletin No. 1).

Anglo-India retreats from the heat of the plains. At Simla, wrote Kipling, "all things begin and many come to an evil end." Many of Kipling's stories and poems have their setting at this famous hill station, among them such early successes as "Plain Tales from the Hills" and "The Phantom Rickshaw." High up the mountainside, on terrace upon terrace, stretch pleasant cottages of the Anglo-Indians. Roads and bridle paths wind among the fir trees beside the English Church and cricket grounds. Only troops of monkeys, swinging from tree to tree, speak of India. Simla, to the Englishman, is a bit of home.

This gay resort is a different world from the plains below on which stretch, mile upon mile, the farming villages that make up the Punjab, stifling hot in summer, freezing cold in winter, depending for their livelihood upon irrigation. Part of this vast region is governed by native rulers, like the Maharajah of Patiala, while part is under direct British control. Both sorts of government have aided in the building of roads and canals and in the establishment of schools to relieve the lot of the dense population crowded in the country of the "five waters."

Bulletin No. 5, December 10, 1928.



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HALF A MILLION DOLLARS WORTH OF COPPER

Within view of the camera on the wharf at Houghton, Michigan, is a fortune in copper ingots. Michigan's peninsula is one of the great copper-producing regions of the world. Copper nearly always enters the world's trade in the form of the ingots shown in this illustration (See Bulletin No. 3).